Pay-for-Performance Subcontract Stimulates Innovation and Reduces Cost During Remediation of a VOC Groundwater Plume at NAS North Island

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Introduction

- DoD directive to control rising remediation and O&M costs – big picture perspective
- Performance-based Payment (PBP) subcontracting
- Case study: CERCLA TCRA at IR Site 5 NAS North Island, CA
- Guidance documents
- Contact information

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DERP Management Guidance – Optimization Requirements

- DUSD (I&E) - September 2001 applies to all environmental restoration response actions at DoD facilities
- Section 20 - DoD Components to continually evaluate implemented remedies
  - Optimizing overall performance and effectiveness of the remedy
  - Controlling O&M costs during the RAO phase
  - Assessing the need for further remediation at a site
  - Determining if a different remediation goal is needed
  - Determining if an alternative technology or approach is more appropriate

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Navy's Perspective - Control Rising Remediation and O&M Costs

- Achieve site closeout in the shortest amount of time and to minimize the cost of ER projects without sacrificing data quality and the ability to make environmentally protective decisions (NAVFAC 2001)
- Evaluate of the total lifecycle cost of the remedy
- Scope projects with optimization and exit strategies in mind and demonstrate continuous optimization
- Utilize site-specific economics and risk reduction to drive decision-making
  - Majority of pump and treat systems are ineffective
- Accelerate site cleanup
  - Stimulates innovation (but with increased risk)

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Performance Based Payment Contracts
NAVFAC Special Report SR-2101-ENV

- PBP is a method of providing financing to contractors performing under a fixed-price contract
- Focuses attention (payment) on the accomplishment of technical milestones
- Establishes realistic performance milestones
  - Developed through partnership with contractor
  - Structured to motivate the contractor
  - Evaluated during the course of the project
- Sets the valuation of meaningful payment events
- Establishes methods to measure/confirm the milestone/achievement

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Case Study – NAS North Island

- At time of award, 1st full-scale ISCO projects in CA
  - ISCO touted by some as a "**silver bullet**" in-situ solution
  - Shaw recognized the need to manage client expectations and financial stake
- Desired outcome Rc ≥ 90% but Team recognized the need to plan for less desirable outcome
- SWDIV, Shaw, and EBSI constructed a PBP contract for the Site 5 ISCO remediation project
- Relative to traditional fixed price contracting, the PBP contract saved SWDIV $120K to $230K

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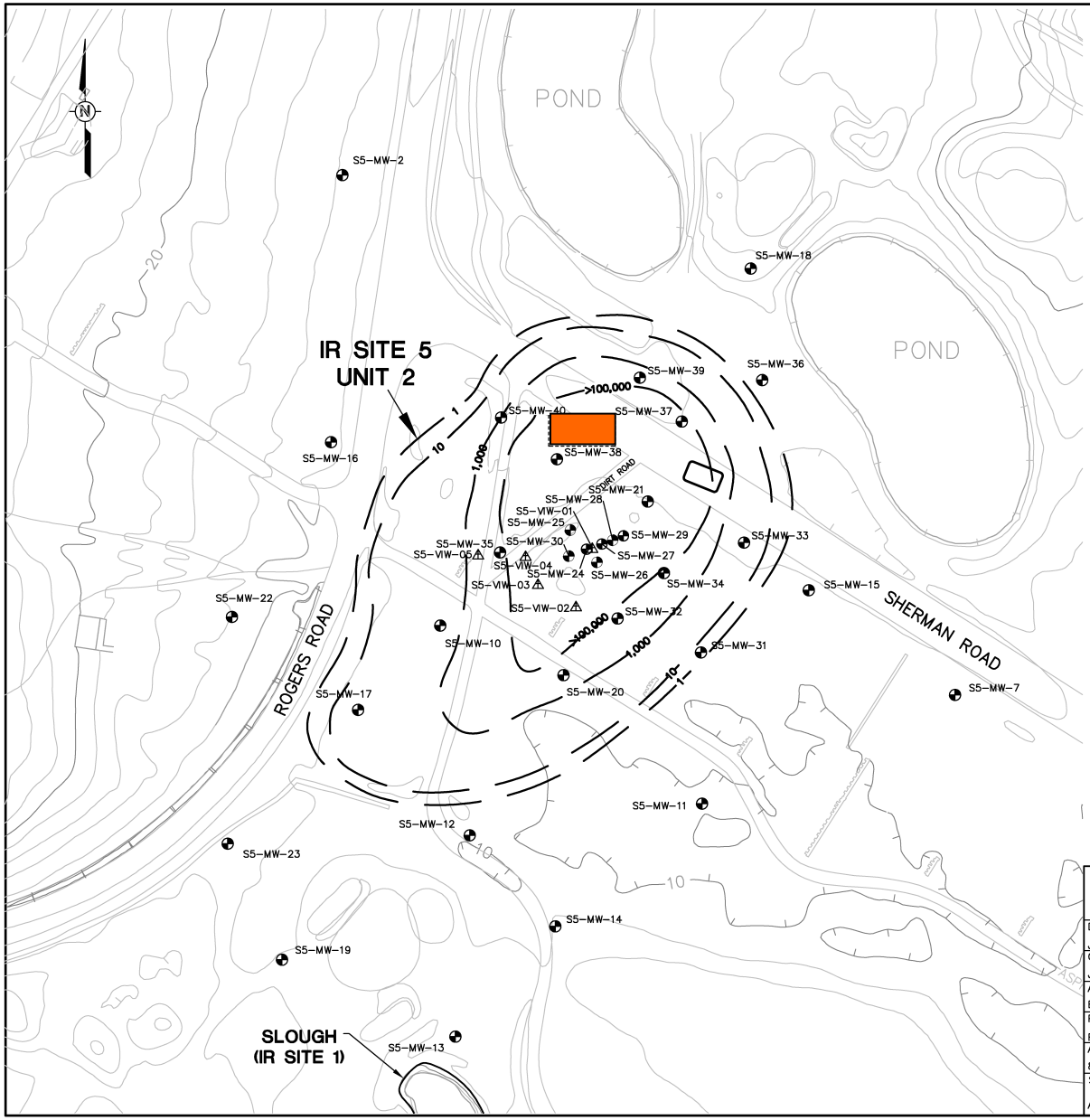
NASNI AirOPs
NG
NAVY
NG
NAVY
Site

Location and Objective

- Location
  - Naval Air Station North Island
  - San Diego, California
- Removal Action Objective
  - Source removal of VOCs in soil and groundwater
  - Performance goal of 90% VOC concentration reduction

IR Site 5 VOC Groundwater Plume



LEGEND:

- 10 — ELEVATION IN FEET, DATUM MLLW
- 662 — BUILDING OR STRUCTURE
- GROUNDWATER FLOW DIRECTION
- ESTIMATED LOCATION OF SUSPECTED FORMER DISPOSAL POND
- SOURCE AREA/IDENTIFIED EXTENT OF FORMER LIQUID DISPOSAL POND
- —10— ESTIMATED EXTENT CONTOURS OF TOTAL SELECTED VOCs IN µg/L
- S5-MW-30 — MONITORING WELL
- S5-VIW-05 — VERTICAL INJECTION WELL
- RUNWAY LIGHTS

Reference:
Rick Engineering, 1994
Parsons Engineering Science, 1999

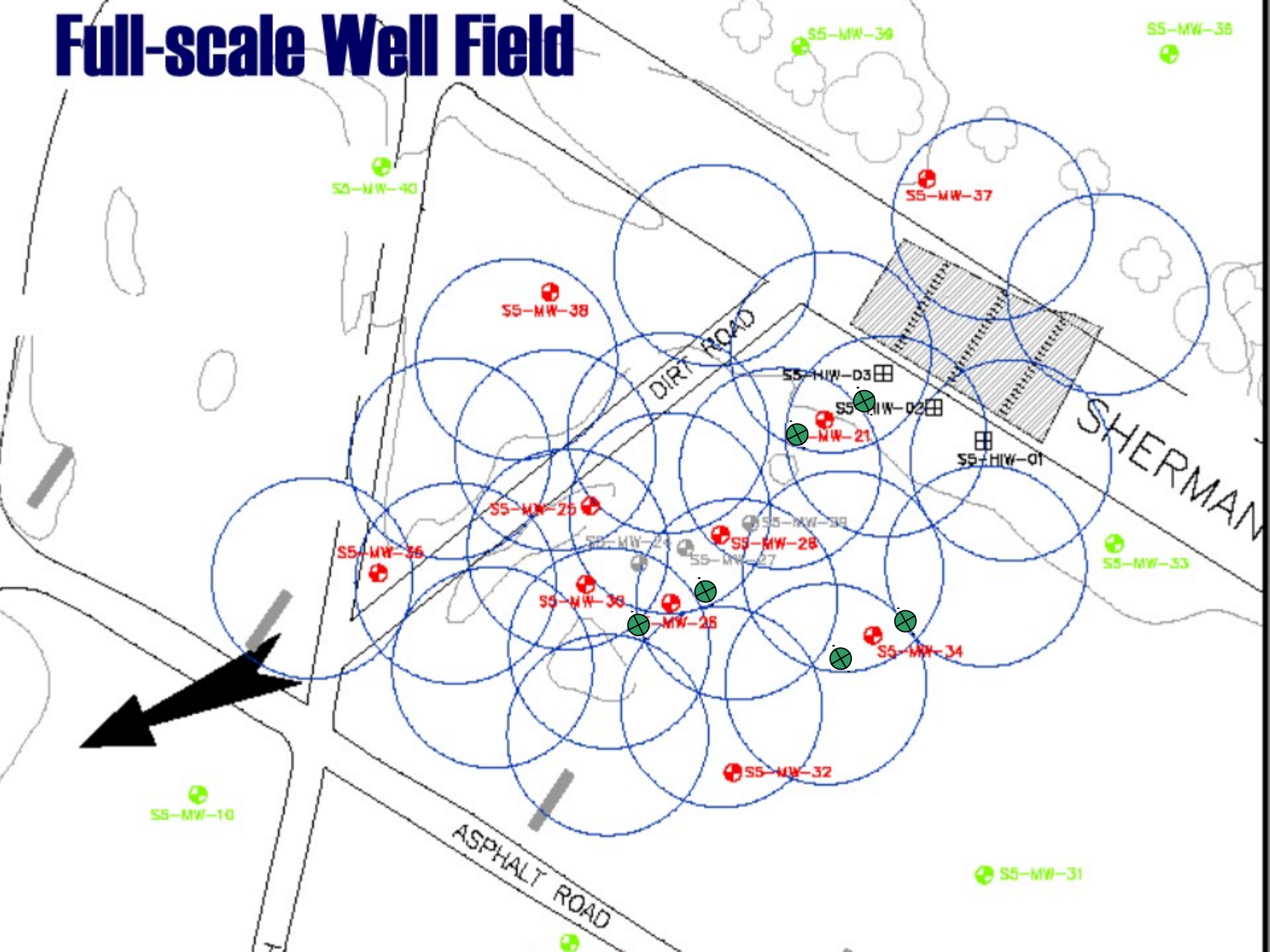
NOTES:

1. SELECTED VOCs INCLUDE CHLORINATED ETHENES, CHLORINATED ETHANES, AND BTEX.

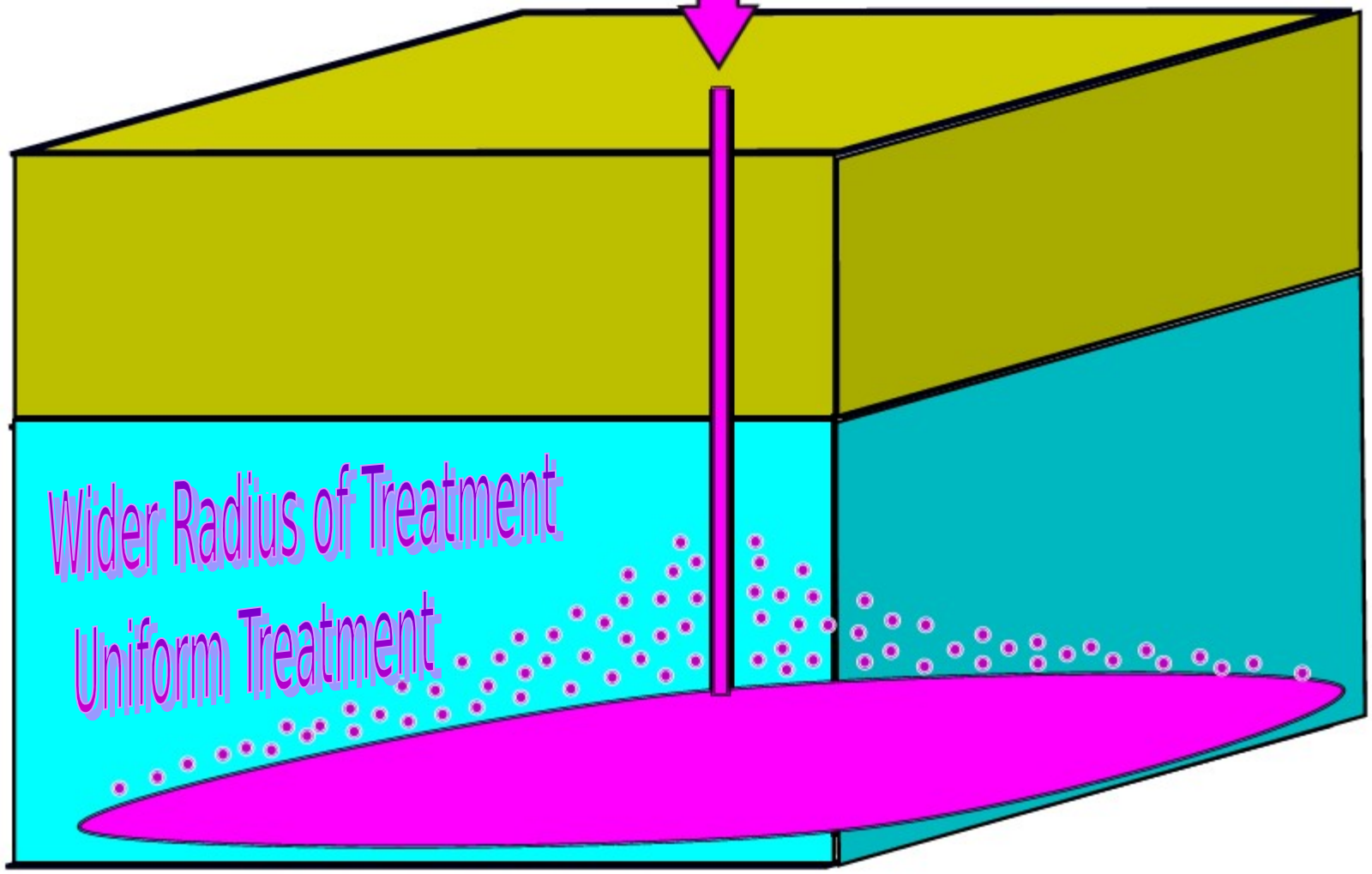
SCALE
0 100 200 FEET

SWDIV					
DRAWN BY: J. CONWELL	DATE: 1/16/01	Shaw	IR SITE 10 SHORELINE SLAG AREA NAVAL AIR STATION, NORTH ISLAND SAN DIEGO, CALIFORNIA		
CHECKED BY: J. SHIPLE	DATE: 1/16/01		FIGURE 2 VERTICAL SITE WELLS IR SITE 5 - UNIT 2		
APP'D BY: B.C. WHITE	DATE: 8/6/02				
PROJECT MANAGER: R. WONG					
AUTOCAD FILE No.: 818725-B14					
SCALE: AS NOTED	SHEET: 1	OF: 1	OHM PROJECT No.: 818725	Document Control No.: -	REVISION: -

Full-scale Well Field



Chemical Oxidants



Solicitation and SOW

- ISCO solicitation
  - Included complete technical information package
  - Pre-bid request for technical qualification submittal and optional presentation
  - Award based on cost, technical approach, and schedule
- ISCO SOW
  - Target goal: 90% reduction in VOC concentrations in GW
  - 2 to 3 treatments
  - 3 months
  - Fixed price components
    - Mob/demob, well installation, and report
  - Requested performance based pricing

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Contract Construction

- **Conventional Approach:** Each project stakeholder attempts to get the best deal.
- **PBP Approach:** Navy and Shaw receive economic protection and contractor is motivated economically to achieve project remediation goals.
- **Economic Impact:** Allowed for evolution of the project and execution of changes to remediation technical approach at no additional cost.

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Pricing of the ISCO Work

- **Conventional Approach:** Prior to field work theory is treated as fact. Uncertainties become risk factors and are reflected in higher costs.
- **PBP Approach:** The cost of the uncertainties are tempered by achievable payments early in the project.
- **Economic Impact:** Savings of ±$50k to $100K

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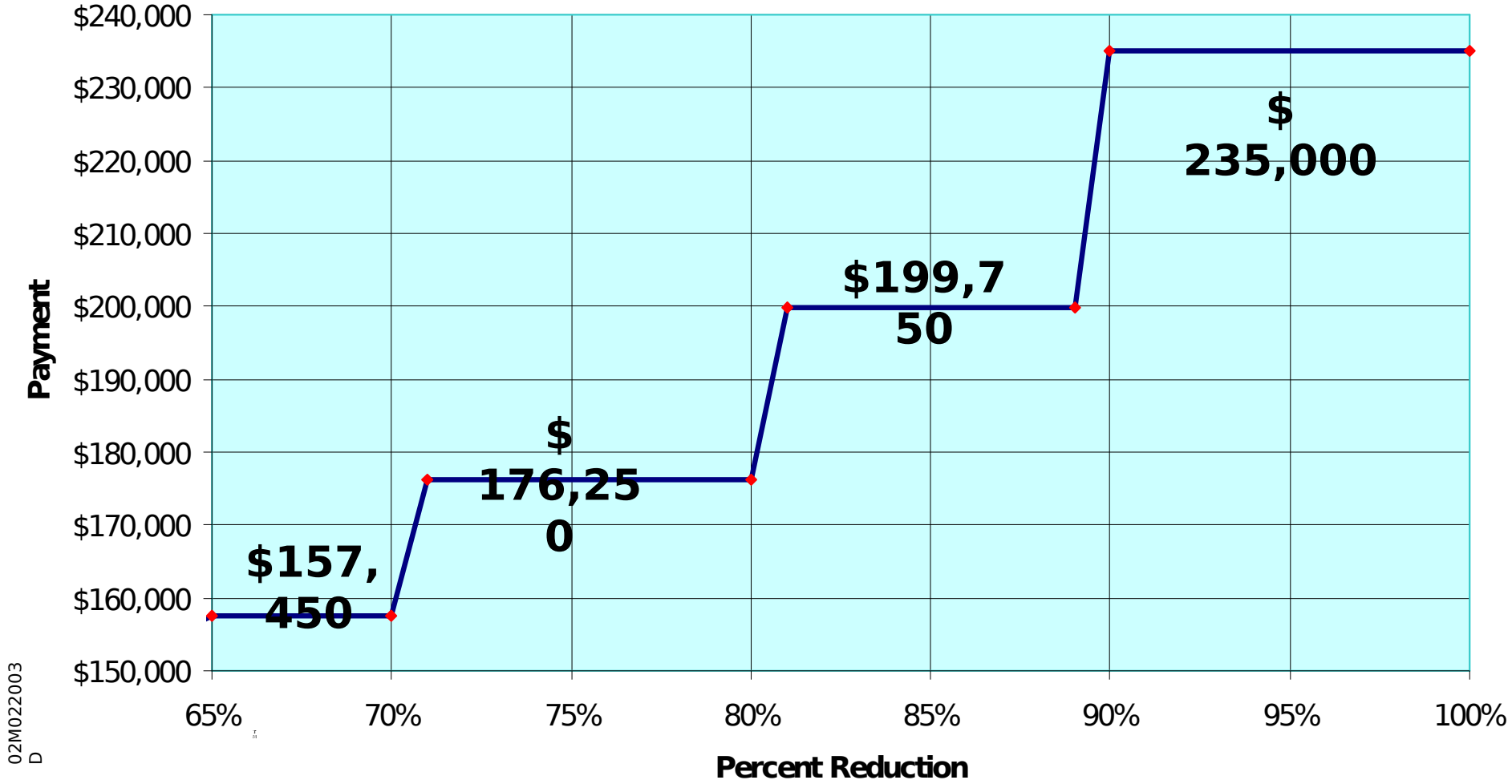
Performance Based Payment Schedule



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Reliance on pilot test and assessment data

- **Conventional Approach:**
  - Pilot test is not indicative of the effectiveness of the full-scale application.
  - Conceptual site model may be revised during the course of the remediation effort.
  - Both conditions would result in delays and change orders.
- **PBP Approach:** Contractor responds to site conditions w/o delay and additional cost.
- **Economic Impact:** Negated the need for more stringent baseline data and/or additional pilot testing. Navy and Shaw receives a best possible value of services.

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Fenton's approach becomes ineffective

- **Conventional Approach:**
  - Contractor makes claim for changed conditions and asks for change order.
  - Most projects stop here. Client is disgruntled and Shaw receives an unfavorable evaluation at the completion of the project.
- **PBP Approach:** Team focuses on solutions and negotiates change to ISCO by potassium permanganate with regulators.
- **Economic Impact:** Work continues without delay or change orders. Savings $60K to $120K

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Injection points do not connect to all monitoring targets

- **Conventional Approach:** Contractor makes claim for changed conditions and asks for change order.
- **PBP Approach:**
  - SOW places burden of addition injection points on the contractor.
  - Contractor is economically motivated to achieve treatment milestone and installs 6 additional wells at no additional cost.
- **Economic Impact:** Savings $10K

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Time constraint force termination of $KMnO_4$ treatments

- **Conventional Approach:** Contractor receives full payment yet desired result is not realized.
- **PBP Approach:**
  - Per contract, contractor is not eligible for a performance based payment.
  - Navy and Shaw evaluate and revise the definition and value of PBP milestones.
  - Contractor receives partial payment and recovers actual costs.
- **Economic Impact:** Treatment provided at contractor's cost.

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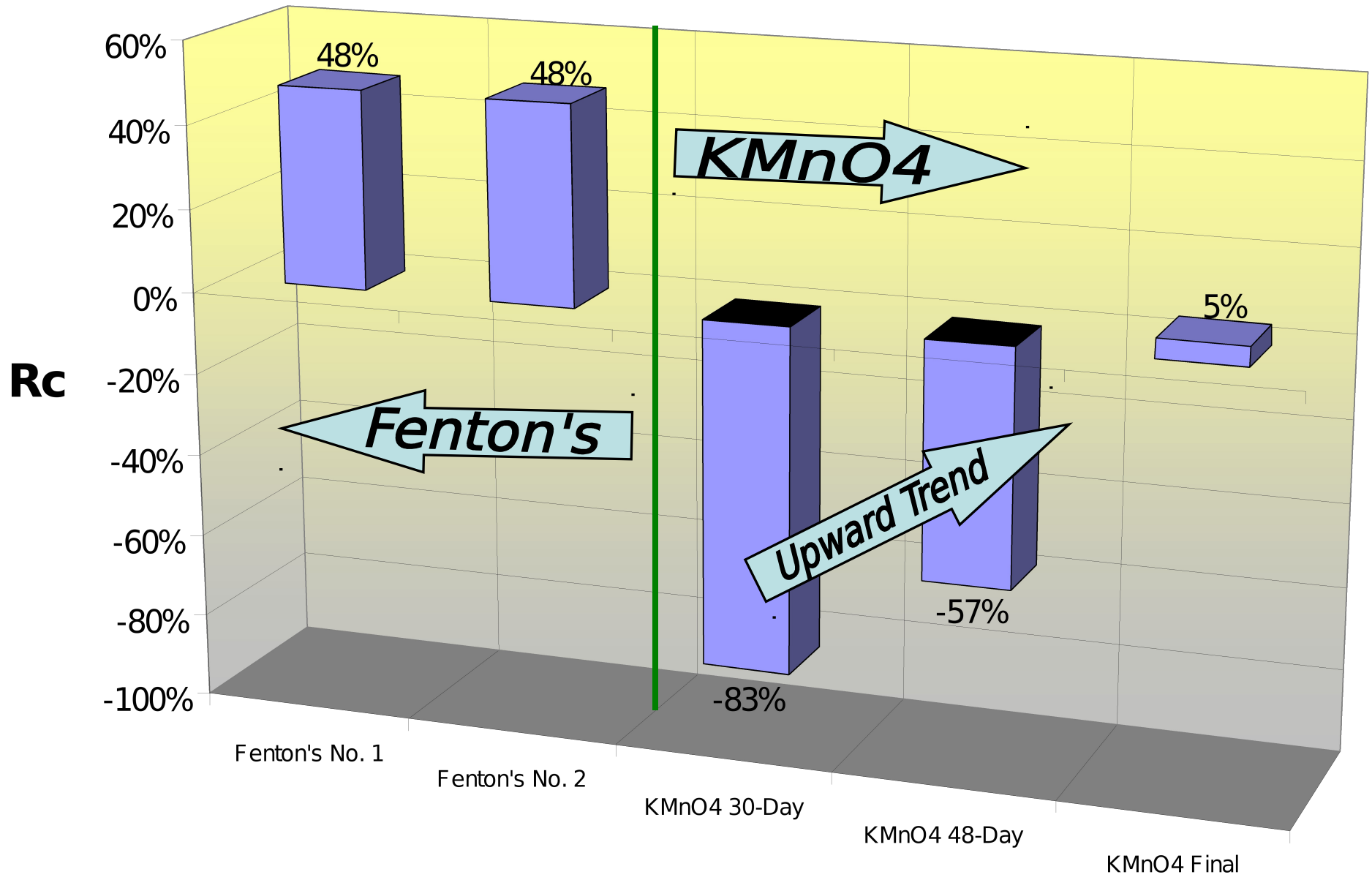
Summary of Treatment Results



Cost savings used to assess impact of ISCO on dechlorinating microbial community

- **An microbial consortium containing DHE was enriched from GW collected at Sites 5 & 9**
  - Bioaugmentation (injection of DHE) could be considered at other Navy sites where MNA has stalled (Treasure Island CA)
  - Used to inoculate the anaerobic FBR to treat highly contaminated GW at IR Site 9 North Island
- **The microbial community was not irreversibly damaged by chemical oxidation**
- **The presence of DHE and ethene confirms that MNA is a viable follow-on treatment technology**

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Ultimate Outcome

- **Conventional Approach:** Economic loss for incomplete project. Relationships are strained and future partnerships are doubtful. Shaw receives unfavorable evaluation and realizes reduced award fee.
- **PBP Approach:**
  - ISCO treatments did not reach ultimate goal but VOC mass is significantly reduced.
  - Remaining budget allows Shaw to begin the next phase of site work.
  - All parties are satisfied and look forward to other opportunities.
- **Economic Impact:** Navy saves approximately $120K to $230K and now has data and results to manage the site.

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Conclusions

- Successful PBPs focuses on measurable technical and schedule performance
- Evaluate and adjust milestones throughout the project
- PBPs help manage expectations and financial risk
- PBPs stimulates innovation and partnership
- Navy saves $120K to $230 and is satisfied with the conclusion of the project

Points of Contact

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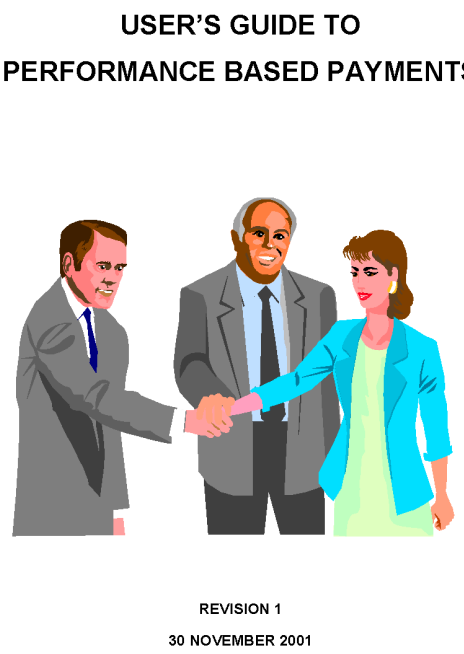
Useful Guidance Documents



- User's Guide To Performance Based Payments
  - http://www.acq.osd.mil/dpap/Docs/PBPGuideNov2001.doc
- Guide to Optimal Groundwater Monitoring
  - http://enviro.nfesc.navy.mil/erb/erb_a/support/wrk_grp/raoltm/rao_interim_final2.pdf
- Guidance for Optimizing Remedial Action Operation (RAO)
  - http://enviro.nfesc.navy.mil/erb/erb_a/support/wrk_grp/raoltm/rao_interim_final2.pdf
- NAVFAC is preparing new guidance for the optimization of the FS to RD phases of an ER project – Release

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